

M.Sc.(Chem.) Semester - 2 (CBCS) Examination
March/April -2019 (Old Course)
PHYSICAL CHEMISTRY (CORE)

Time: 2:30 Hours**Marks: 70****Instructions:**

1. All questions are compulsory.
2. Figures to the right indicate marks.

Q.1 Answer any seven of the following ten questions.**[14 Marks]**

1. Explain nonlinear polycondensation.
2. Discuss the reaction route of polyfunctional compound.
3. Give two examples each of bi, tri and tetra functional compound.
4. Explain effect of temperature and monomer concentration on ring polymer equilibrium.
5. Give the full form and write the repeat units of the following.
PVC, PMMA, Starch, Nylon-66.
6. Explain effect of activator concentration on rate of ring scission polymerization and molecular weight of the polymer.
7. Explain interfacial polycondensation method.
8. Explain factor affecting free radical polymerization.
9. Explain gradient elution technique.
10. What are polymers? Give the Classification of polymers with suitable examples.

Q.2 Answer the following (Answer any three)**[14 Marks]**

1. Explain isolation and purification of polymers.
2. Describe various methods of initiating free radical polymerization.
3. A laboratory preparation of 610 nylon was made with 0.2 mole % acetic acid (based on carboxyl groups) as a viscosity stabilizer. The reaction was carried to completion. Calculate M_n and M_w .
4. Discuss about Crosslinking reaction.

Q.3 Answer the following questions.**[14 Marks]**

1. Explain: (a). Stereo regular polymers.
(b). Functionality and polymerization concept.
2. Explain the fractional and gel permeation chromatography method.

OR

Q.3 Answer the following questions.**[14 Marks]**

1. Explain the evaluation of reactivity ratios.
2. Write a note on: (a). Kinetics of polycondensation reaction.
(b). Molecular weight control in polycondensation.

Q.4 Answer the following questions. (Any two)**[14 Marks]**

1. Discuss about polycondensation equilibrium and molecular weight of polymer.
2. Explain kinetics of cationic and anionic polymerization.
3. Explain addition and substitution reaction.

Q.5 Answer any two of the following four questions.**[14 Marks]**

1. Explain kinetics of free radical polymerization and chain transfer reaction.
2. (a). Explain the methods of polycondensation.
(b). In an experiment, kinetic chain length in presence (v_{tr}) and in absence (v_t) are evaluated at 60°C for vinyl acetate undergoing chain transfer with dimethyl ketone solvent. v_{tr} is 93 and v_t is 6670. The ratio of $[S]/[M]$ is 0.583. Calculate the chain transfer constant for this reaction.
3. Explain: (a). stepwise polymerization
(b). Thermodynamics of ring transesterification to a linear polymer.
4. Explain degradation and its classification.
